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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, DC 20555

South Texas Project
Units 1 and 2
Docket Nos. STN 50-498, STN 50-499
Third Interim Report Concerning Veritrak Transmitters

On August 1, 1986 Houston Lighting & Power Company notified your office pursuant to 10CFR50.55(e), of an item concerning Veritrak Transmitters at the South Texas Project. Enclosed is the Third Interim Report on this item. Our next report will be submitted by May 15, 1987.

If you should have any questions on this matter, please contact Mr. C. A. Ayala at (512) 972-8628.

J. H. Goldberg
Group Vice President, Nuclear

THC/yd

Attachment: Third Interim Report Concerning
Veritrak Transmitters

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I. Summary

On August 1, 1986, Houston Lighting & Power (HL&P) notified the NRC Region IV of a potentially reportable item concerning excessive change in Veritrak transmitter accuracy under ambient temperature conditions.

Westinghouse reported that Veritrak transmitters used to provide input for various Reactor Protection System trip functions, ESF actuation, and post-accident monitoring are subject to excessive drift in their outputs under varying ambient temperature conditions. This concern applies only to safety-related Veritrak and TOBAR transmitters.

Based on Westinghouse evaluation of Reactor Protection System trip and ESF actuation functions, the conclusions stated in the STP FSAR remain valid when the effect of the increased Veritrak transmitter uncertainties are included.

II. Description of Deficiency

Veritrak transmitters may be subject to temperature drift which exceeds the inaccuracy assumed in the safety analysis. Transmitter uncertainties in excess of those assumed in the safety analysis have been observed in transmitters manufactured by Veritrak/TOBAR by another utility. Testing of TOBAR transmitters was also performed, and these transmitters are reported to exhibit the same problem, although to a lesser extent.

In early 1986, Public Service of New Hampshire reported an excessive change in Veritrak transmitter accuracy as the ambient temperature changed. Initial tests were limited to 130^{o}F, but subsequent testing on a larger sample of Veritrak units supplied by TOBAR (formerly Veritrak) at all original calibration points (130, 280, 320^{o}F) demonstrated significant errors. In March of 1986, Public Service of New Hampshire reported, pursuant to 10CFR50.55(e), that excessive changes in Veritrak transmitter accuracy as the ambient temperature changed were observed which could create a condition that could violate allowable performance specification limits.

III. Corrective Action

Westinghouse has initiated a test program to evaluate the temperature drift and to identify corrective measures. In order to address this concern for plants having Veritrak/TOBAR transmitters installed, Westinghouse has systematically combined the drift values observed in the test sample and applied these values to units installed at STP for the affected reactor protection trip and ESF actuation functions.

Table 1 provides a list of functions at STP which are affected by this concern. The protective actions listed are assumed to occur as part of the basis for various FSAR accident analyses, while pressurizer pressure control is assumed to be available for all events. Because temperatures in the Reactor Containment Building (RCB) and Isolation Valve Cubicle (IVC) are much higher post-accident than during normal conditions, and transmitters in the Mechanical Auxiliary Building (MAB) and Fuel Handling Building (FHB) are post accident monitoring instruments not affected by DBA temperatures, Table 1 lists only transmitters located in the RCB and IVC.

The Westinghouse safety evaluation demonstrates acceptability of the existing FSAR analyses and protection system setpoints. For some events, the low pressurizer pressure safety injection (SI) signal may not be generated; however, protection is provided by alternate means, as discussed in the safety evaluation. To assure that low pressurizer pressure ESF actuation does occur taking into account the additional errors associated with the Veritrak transmitters, the low pressurizer pressure SI setpoint will be raised to 1869 psig. This action is conservative, although not required to demonstrate protection.

Since the Westinghouse analyses are conservative in assuring plant safety, no hardware modifications are required at this time. The Westinghouse test program is ongoing. Three options for long term corrective action are under consideration at this time: (1) modify the Veritrak transmitters such that the original specifications are met, (2) revise the FSAR Chapter 15 analyses and setpoints as necessary to reflect the final Veritrak uncertainty allowances, or (3) replace the Veritrak transmitters with different hardware and revise the corresponding setpoints and the FSAR as necessary to reflect the new instrument uncertainty allowances. HL&P will evaluate the final results of the test program, expected to be completed by August, 1987, and initiate the appropriate long term corrective action. In the interim however, the safety evaluation shows that startup and operation of the South Texas Project may safely continue.

Any corrective action necessary for the Emergency Operating Procedure (EOP) setpoints, which are discussed in the Safety Analysis section, will be addressed in the next report.

IV. Recurrence Control

This is an isolated situation; therefore, no recurrence control measures are required.

V. Safety Analysis

Based on results of the Westinghouse Veritrak transmitter test program to date, Westinghouse has determined conservative values of thermal drift allowance for the affected protection functions. As stated above, these

values were systematically combined to determine new, conservative channel uncertainty allowances. For those protective functions where greater margin exists between the nominal setpoint and the safety analysis limit than the revised uncertainty allowance, there is no impact upon the safety analysis.

For those protective functions which do not contain sufficient margin, a second step is required. Revised safety analysis limits were calculated for these functions, including an additional allowance for margin. The impact of revising the safety analysis limits has been evaluated by Westinghouse for those FSAR Chapter 15 events which take credit for any of the reactor trip or ESF actuation functions listed in Table 1. It was shown that sufficient margin exists such that, if the events were to be reanalyzed with the revised safety analysis limits, acceptable results would be obtained. The results of the current FSAR Chapter 15 analyses would be slightly affected (i.e., curves presented in the Chapter 15 figures would be indistinguishable; however, the time sequences of the events would be expected to change). The conclusions of the Chapter 15 analyses would remain valid, in that DNB limits are not exceeded, fuel failures do not exceed allowed limits, peak clad temperatures do not exceed allowed limits, etc.

The revised uncertainties for the low pressurizer pressure safety injection setpoint result in channel uncertainty allowances which are greater than the difference between the current nominal setpoint value and the bottom of the instrument span (1700 psig). Thus, it is possible that the SI signal may not be generated. The analyses of two events take credit for low pressurizer pressure safety injection: small break LOCA and credible steamline break. These were investigated by Westinghouse to ascertain the consequences of losing the function of the low pressurizer pressure safety injection signal. In those events where a low pressurizer pressure safety injection may not be generated as assumed, reactor protection would be provided by either containment high pressure SI or low steamline pressure SI. For each of these two events, the evaluation shows that the DNB design basis was met and, therefore, the FSAR conclusions remain valid.

The accuracy of the pressurizer pressure control system establishes the minimum amount of uncertainty which must be applied to the assumed initial pressure for an event. The increase in pressurizer pressure channel uncertainty requires an increase in the present initial condition uncertainty allowance. Based on a review of the available margin, the conclusions stated in the FSAR remain valid when the effects of the increased Veritrak transmitter errors are included.

Post accident monitoring parameters listed in Table 1 were also reviewed to identify any similar safety concerns relative to maintaining the critical safety functions. For pressurizer level, reactor vessel water level instrumentation provides a diverse indication to verify Reactor

Coolant System (RCS) inventory during an event. Likewise, Auxiliary Feedwater (AFW) flow provides diverse indication to steam generator water level to confirm adequate heat sink. RCS wide range pressure provides backup indication to pressurizer pressure in verifying integrity. Since the steamline pressure transmitters are located in the IVC, indication for a single steamline only could be affected by an event in the the IVC. The instrumentation on the remaining steamlines provides adequate indication for accident monitoring. For the remainder of the post-accident monitoring channels, relative indication between redundant ESF trains provides the capability to ascertain functionality through a cross check among the redundant systems. However, several of these instruments are associated with operator action setpoints specified in the emergency operating procedures (EOPs). The impact of additional indication uncertainties on these operator action points have not yet been determined.

The conclusions stated in the FSAR remain valid when the effect of the increased Veritrak transmitter errors is considered. Determination of reportability pursuant to 10CFR50.55(e) will be addressed in the Final Report.

TABLE 1

Functions Performed by Veritrak/TOBAR Transmitters
(Located in RCB or IVC Only)*

Reactor Trip Functions

- Overtemperature delta-T
- Pressurizer level high
- Steam generator water level lo-lo
- Pressurizer pressure high
- Pressurizer pressure lo

ESF Actuation Functions

- Steam generator water level lo-lo (AFW initiation)
- Steam generator water level hi-hi (turbine trip, feedwater isolation)
- Pressurizer pressure lo (safety injection)
- Steam line pressure low** (safety injection, steamline isolation)
- Steam line pressure high negative rate of change** (steamline isolation)

Post-Accident Monitoring

- Pressurizer level
- Steam generator water level (wide range and narrow range)
- Pressurizer pressure
- LHSI discharge pressure**
- SI accumulator pressure**
- Steam generator steam flow
- RHR pump discharge flow**
- LHSI pump hot leg recirculation flow**
- Steam line pressure**

Control Functions

- Pressurizer pressure control

* Veritrak/TOBAR transmitters are also located in the MAB and FHB. They are used for RCP seal injection flow, charging flow, RCS loop pressure, letdown flow and containment spray flow monitoring.

** TOBAR transmitters (unmarked instruments are Veritrak transmitters)

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